THAT WHICH IS CLAIMED IS:

1. A system for providing a record of the flight performance of an aircraft and engine comprising:

a plurality of sensors positioned on the aircraft for sensing engine conditions and generating engine data relating to operation of the engine during at least initial take-off;

a ground data link unit positioned within the aircraft and operatively connected to said plurality of sensors for receiving said engine data, said ground data link unit comprising:

a) a data store operative to accumulate and store flight performance data and engine data during at least initial take-off during flight of the aircraft, and

b) a spread spectrum transceiver coupled to said data store, and comprising a transmitter that is operative after the aircraft completes its flight and lands at an airport to download said flight performance data that has been accumulated and stored by said data store during flight over a spread spectrum communication signal, wherein said spread spectrum transceiver also receives said engine data and is operative to download said engine data upon initial take-off over a spread spectrum communication signal; and

an airport based spread spectrum receiver for receiving the spread spectrum communication signal from the aircraft upon initial take-off and demodulating the spread spectrum communication signal to obtain the engine data.

2. A system according to Claim 1, wherein said data store of said ground data link unit is operative to store engine data.

3. A system according to Claim 1, wherein said aircraft includes a FADEC engine control system, wherein said sensors are operatively connected to said FADEC engine control system.

4. A system according to Claim 1, wherein said sensors are positioned to sense at least one of said core compartment bleeding, sump pressurization, sump vent, active clearance control, and low pressure and high pressure recoup.

5. A system according to Claim 1, wherein said sensors are positioned to sense at least one of oil pressure, oil temperature, fuel flow and engine hydraulics.

6. A system according to Claim 1, and further comprising a plurality of sensors located throughout the aircraft for sensing routine aircraft conditions and generating parametric data such as received by a flight data recorder representative of the aircraft flight performance during flight of said aircraft.

7. A system according to Claim 6, and further comprising a multiplexer connected to said plurality of sensors and ground data link unit for receiving the parametric data and multiplexing the parametric data for delivery to said ground data link unit.

8. A system according to Claim 1, and further comprising an airport based server connected to

said airport based spread spectrum receiver for receiving said engine data for further processing of said engine data.

9. A system according to Claim 1, and further comprising a remote flight operations center operatively coupled to said airport based spread spectrum receiver for receiving and processing engine data downloaded from said aircraft.

10. A system according to Claim 1, and further comprising a remote flight operations center operatively coupled to said airport based server for receiving and processing flight performance data.

11. A system according to Claim 1, wherein the spread spectrum communication signal comprises a direct sequence spread spectrum signal.

12. A system according to Claim 1, wherein the spread spectrum communication signal comprises a signal within the S band.

13. A system according to Claim 1, wherein the spread spectrum communication signal comprises a signal within the range of about 2.4 to about 2.5 GHz.

14. A system according to Claim 1, wherein said archival data store of said ground data link unit further comprises means for compressing said flight performance data during the flight of the aircraft.

10 15. A system according to Claim 1, wherein said emitted power of said spread spectrum communication signal is about 1 watt.

16. A system for providing a record of the flight performance of an aircraft and engine comprising:

a plurality of sensors positioned on the aircraft for sensing engine conditions and generating engine data relating to operation of the engine during at least initial take-off;

a ground data link unit operatively connected to said plurality of sensors for receiving said engine data, said ground data link unit comprising:

a central processing unit that receives said engine data and processes said engine data to determine engine event problems, and

a spread spectrum transceiver having a transmitter that receives said processed engine data from said central processing unit and is operative to download said engine data upon initial take-off over a spread spectrum communication signal; and

an airport based spread spectrum receiver that receives the spread spectrum communication signal from the aircraft upon initial take-off and demodulates the signal to obtain the engine data for forwarding and further processing.

17. A system according to Claim 16, wherein said ground data link unit further comprises a data store for accumulating and storing flight performance data generated during flight of said aircraft.

18. A system according to Claim 17, said airport based spread spectrum receiver is also adapted for receiving flight performance data that has been stored and downloaded from a ground data link unit after an aircraft has landed at the airport.

19. A system according to Claim 17, and further comprising a plurality of sensors located throughout the aircraft and operatively connected to said data store for sensing routine aircraft conditions such as received by a flight data recorder representative of the aircraft flight performance during flight of said aircraft and generating parametric data to said data store.

20. A system according to Claim 19, and further comprising a multiplexer connected to said plurality of sensors and ground data link unit for receiving the parametric data and mulitplexing the parametric data for delivery to said ground data link unit.

21. A system according to Claim 17, wherein said data store is operative to store engine data.

22. A system according to Claim 15, wherein said aircraft includes a FADEC engine control system, wherein said sensors are operatively connected to said FADEC engine control system.

23. A system according to Claim 22, wherein said sensors are positioned to sense at least one of said core compartment bleeding, sump pressurization, sump vent, active clearance control, and low pressure and high pressure recoup.

24. A system according to Claim 15, wherein said sensors are positioned to sense at least one of oil pressure, oil temperature, fuel flow and engine hydraulics.

25. A system according to Claim 16, and further comprising an airport based server connected to

said airport based spread spectrum receiver for receiving said engine data for further processing of said engine data.

26. A system according to Claim 16, and further comprising a remote flight operations center operatively coupled to said airport based spread spectrum receiver for receiving and processing engine data downloaded from said aircraft.

27. A system according to Claim 15, wherein the spread spectrum communication signal comprises a direct sequence spread spectrum signal.

28. A system according to Claim 15, wherein the spread spectrum communication signal comprises a signal within the S band.

29. A system according to Claim 15, wherein the spread spectrum communication signal comprises a signal within the range of about 2.4 to about 2.5 GHZ.

30. A system according to Claim 15, wherein said emitted power of said spread spectrum communication signal is about 1 watt.

31. A method of providing a record of the flight performance of an aircraft and engine comprising:

collecting engine data within a ground data link unit during initial take-off of an aircraft from an airport;

processing the engine data within a central processing unit of the ground data link unit to determine engine problems;

upon initial take-off, downloading the engine data that has been collected during initial take-off

over a spread spectrum communication signal to an airport based spread spectrum receiver; and

demodulating within the airport based spread spectrum receiver the spread spectrum communication signal to obtain the engine data for further processing.

32. A method according to Claim 31, and further comprising the step of forwarding the engine data to an airport based server connected to the airport based spread spectrum receiver and processing the engine data within the airport based server.

31 33. A method according to Claim 30 31, wherein the spread spectrum communication signal comprises a direct sequence spread spectrum signal.

32 34. A method according to Claim 30 31, wherein the spread spectrum communication signal comprises a signal within the S band.

33 35. A method according to Claim 30 31, wherein the spread spectrum communication signal comprises a signal within the range of about 2.4 to about 2.5 GHZ.

Sub B8 36. A method of providing a record of the flight performance of an aircraft and engine comprising:

collecting engine data within a ground data link unit during initial take-off of an aircraft from an airport;

upon initial take-off, downloading the engine data that has been collected during initial take-off over a spread spectrum communication signal to an airport based spread spectrum receiver;

demodulating within the airport based spread spectrum receiver the spread spectrum communication signal to obtain the engine data;

forwarding the demodulated data to a server for further processing;

collecting data within the ground data link unit on the flight performance of the aircraft during flight of the aircraft;

accumulating and storing within a data store of the ground data link unit the flight performance data;

after the aircraft lands at an airport at completion of the flight, downloading the flight performance data that has been accumulated and stored during the flight over a spread spectrum communication signal to an airport based spread spectrum receiver; and

demodulating within the receiver the received spread spectrum signal to obtain the flight performance data.

35 37. A method according to Claim 36, and further comprising the step of processing the engine data within an airport based server connected to the airport based spread spectrum receiver.

36 38. A method according to Claim 34 36, wherein the spread spectrum communication signal comprises a direct sequence spread spectrum signal.

37 39. A method according to Claim 34 36, wherein the spread spectrum communication signal comprises a signal within the S band.

38 40. A method according to Claim 34 36, wherein the spread spectrum communication signal comprises a signal within the range of about 2.4 to about 2.5 GHz.

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